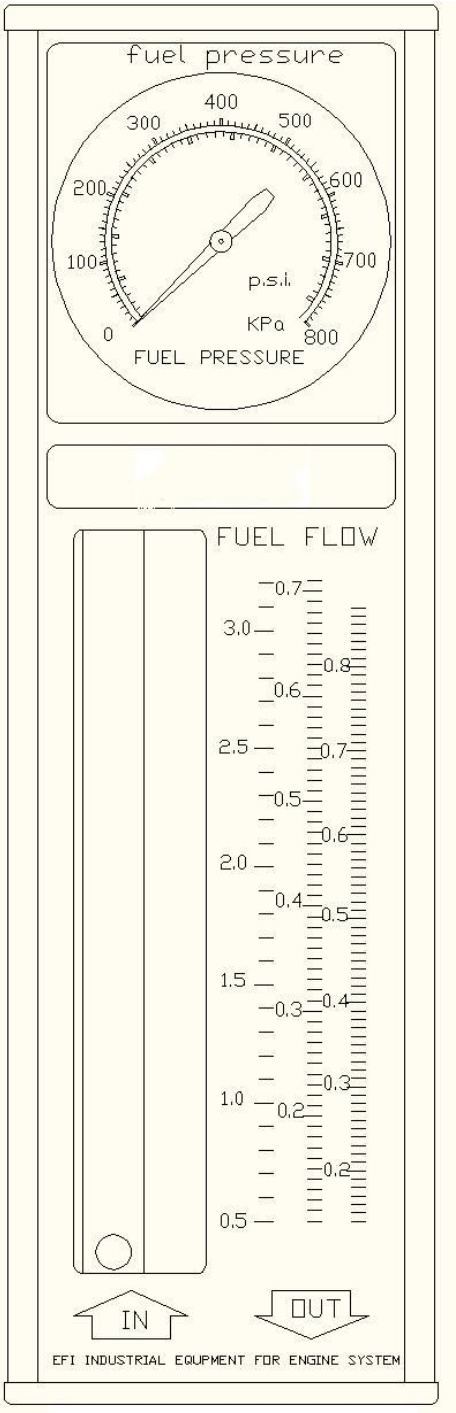
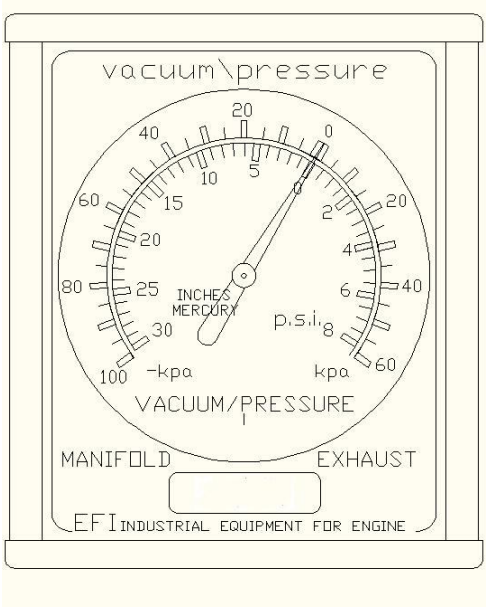
EFI Engine Fuel Pressure Tester with Flow Meter

User's manual





For morden vehicles with electronic fuel injection system, accurate control of fuel pressure and flow is must. When the pressure or flow does not meet OEM requirements, the performance of the engine will be affected. This may lead to difficulties in starting or excessive fuel comsumption.To keep the engine in smooth working condition, and to prevent unnecessary replacement of parts, constant testing of engine system is highly advisable. It is also necessary to inspect engine fuel system in order to get rid of all the potential problems. The EFI Fuel System Tester can test the intake air vacuum and the exhaust backpressure.

Features:

1. Fuel pressure test
2. Fuel flow test
3. Engine intake manifold vacuum test
4. Backpressure in exhaust manifold test
5. Various connectors to fit various vehicle models

Specifications:

1. Range of fuel pressure: 0~800Kpa
2. Range of fuel flow: 0.5~3L/Min
3. Range of engine vacuum:-100~0Kpa
4. Range of backpressure: 0~60Kpa
5. Weight: 3.3Kg
6. Dimensions: 400mmx315mmx95mm

Operation procedures:

1. Fuel system pressure and volume test

CAUTION: *Do not smoke or work near an open flame when working on fuel system inspection. Observe fuel system safety precautions when connecting and disconnecting the pressure gauge.It is advisable to disconnect the battery ground before opening any fuel system fitting. Then reconnect the cable to run the engine for testing. Use this pressure/flow gauge to test fuel system, it is unnecessary to road test vehicle when it is necessary to test fuel volume output.We can check the volume output by the pressure/flow gauge while the engine idle.*

1.1.Remove the gas cap to relieve air pressure in the fuel tank. Then relieve fuel system pressure at the station between the fuel input line and the fuel distribution pipe where we are going to connect the gauge. Connect the pressure/flow gauge with a suitable fuel pressure test adapter.

1.2. Start the engine and let it idle, pay attention to the pressure gauge and the fuel flow meter. Generally, fuel pressure should read about 43psi(300kpa)

and the fuel flow should read 2 liter/Min. However the pressure and the flow readings are still different from various vehicle models. User should refer to OEM requirements from the vehicle service manuals.

1.3.Disconnect the vacuum line at the pressure regulator and then plug the vacuum hose. Fuel pressure should rise as vacuum line is disconnected. Generally, the pressure should rise 4 to 6 psi from the regulated reading. If the pressure does not rise as vacuum line is disconnected, connect a vacuum gauge or hand vacuum pump with gauge to the disconnected hose,and start the engine and let it idle. Check the vacuum gauge reading:

a. If vacuum shows, reconnect the vacuum hose to the regulator. Wrap a shop cloth around the fuel return hose and lightly pinch off the hose, then the pressure should rise; if not, the fuel pump may be defective; if dose, the regulator may be defective.

b. If no vacuum shows, inspect pressure regulator vacuum lines for improper routing, loose connection, and damaged or deterioration. Replace it as required. If the hose is good, check the cutoff solenoid if the engine has or for an engine problem. Some engine fuel pressure regulator is controled by a cut off solenoid valve at coolant temperatures above about 211°F(105°C) or intake air temperatures above about 170°F(80°C). Disconnect the vacuum hose at the pressure regulater. Connect a vacuum gauge or hand vacuum pump with gauge to the disconnect hose. Start the engine, and warm it to normal operating temperature (electric cooling fan on). Intake air temperature must exceed about 176°F(80°C). Check the vacuum gauge reading. If vacuum shows, test the pressure regulater cutoff solenoid valve as described in the vehicle service manuals.

1.4.Start the engine and let it idle; generally, the fuel flow should read 1.0~2.0 liter/Min. If the flow reading is under 0.6 liter/Min, the fuel volume output from the pump is insufficient. Potential problems might be lack of power, rough running, engine surges or any fuel -pressure regulated problems and so on. If the fuel flow is too low, the fuel filter, pump inlet filter or the pump may be defective. Wrap a shop cloth around the fuel return hose and lightly pinch off the hose, the fuel pressure should rise about 15psi(100kpa); if it dose rise, the filter or the pump inlet filter may be restricted; if it does not rise, the fuel pump may be defective. For example, some vehicles such as TOYOTA CAMRY, there is no regulator at the delivery pipe. In order to check the fuel volume output from the pump, disconnect the intake fuel pipe and connect the pressure/flow gauge, then put the outlet hose of the gauge in a keg. Connect the fuel pump relay with a short wire to run the full pump. Punch the outlet hose of the gauge gradually with the fuel pliers while watching the pressure gauge reading. The pressure should rise to the station below normal about 0.5 psi then

keep it steady and keep reading the flow meter. The fuel volume should meet requirements.

2. Fuel Pressure Regulator Test

For some engines, vacuum to the pressure regulator is controlled by a cutoff solenoid valve at coolant temperatures above about 221°F(105°C) or intake air temperature above about 176°F(80°C).

2.1. Inspect pressure regulator vacuum lines for improper routing, loose connections, and damage or deterioration.

2.2. Disconnect the vacuum hose at the pressure regulator. Connect a vacuum gauge or hand pump with gauge to the disconnected hose.

2.3. Start the engine and let it idle. Check the vacuum gauge reading:

a. If vacuum shows, continue testing.

b. If no vacuum shows, test the pressure regulator cutoff solenoid valve as described in the vehicle service manuals.

2.4. Remove the vacuum gauge or pump/gauge and reconnected the vacuum line to the pressure regulator.

2.5.Check the pressure gauge, fuel pressure should be about 43psi(300kpa). Bear in mind the pressure readings are different from various vehicle models. User should refer to OEM requirements as described in the vehicle service manuals.

2.6. Disconnect the vacuum hose at the regulator, fuel pressure should rise about 4 to 6 psi from the regulated reading as vacuum hose is disconnected.

2.7.If pressure does not rise in step 6, wrap a shop cloth around the fuel return hose and lightly pinch off the hose, while doing this, watch the pressure gauge reading, the pressure should rise; if it does rise, the pressure regulator may be defective; if it does not rise, the fuel pump may be defective.

CAUTION: *When pinch off the fuel return hose, do not allow the pressure rise too high, such as 100psi (700kpa) or the gauge and the fuel hose will be damaged*.

3. Fuel Static Pressure Test

Start the engine and let it idle for 2 to 3 minutes, then turn the engine off, and check the pressure after 10 minutes. Fuel pressure should stay at about 25 to 30 psi or higher. If the system does not hold pressure, it may be caused by:

●faulty fuel pump check valve

●a leaking hose coupling at the pump

●a leaking fuel pressure regulator

●an injector that is stuck open

Check for the leakage from fuel pump, injectors or from the regulator.

3.1.Connect the pressure/flow gauge at a suitable station after fuel filter before fuel regulator. Start the engine, let it idle for a minute,then turn off the engine. Wrap a shop cloth around the fuel return hose and lightly pinch off

the hose with the fuel hose pliers before the pressure drop to too low. Check the pressure gauge reading:

a. If the pressure does not drop any more, the leakage may be from the regulator.

b. If the pressure keeps dropping, continue testing with step 3.2.

3.2.Disconnect the fuel hose pliers, and restart the engine, let it idle for a minute, then turn off the engine. Wrap a shop cloth around the fuel outlet hose of the pressure/flow gauge and lightly pinch off the hose before the pressure drop to too low. Check the pressure gauge reading:

a. if the pressure does not drop any more, the leakage may be from one of the injectors.

b. If the pressure keeps dropping, the leakage may be from the fuel pump.

3).Relieve system pressure, remove the tester, and restore all the connections.

4. Air lock in fuel system test

Air lock may be caused by:

●insufficient gasoline in the fuel tank

●a restricted pump inlet filter

●polluted gasoline in hot condition

Connect the pressure/flow gauge and start the engine, watch the pressure and flow, if they are surging quickly, there may be air in the system. Stop the engine, disconnect the fuel pump fuse or the fuel pump relay, then restart the engine again, keep watching the flow meter. There may be balls of air become bigger as fuel pressure drops. While doing this, pay attention if the gasoline is dirty and if there are drops of water in the gesoline.

5. Exhaust system backpressure test for restricted exhaust or catalytic converter

The exhaust oxygen(O2) sensor can be removed from the manifold on most engines for access to the exhaust system for testing. On some engines, the sheet metal heat shield must be removed for easy access to the sensor. On some engines, it may be easier to test exhaust backpressure by removing the EGR valve. Be sure to plug the EGR inlet to the intake manifold during testing.

NOTE: During removal, *access to the O2 sensor may be difficult on some vehicles. If the engine has air injection, you may be able to remove the air injection check valve or tube and connect the pressure gauge in this location. Be careful not to damage the check valve*

CAUTION: *Remove the exhaust oxygen (O2) sensor carefully to avoid damaging the threads on the sensor or in the manifold.*

5.1. Remove the O2 sensor or the EGR valve and install the backpressure tap (E301) into the manifold.

5.2. Start the engine and let it warm up until the coolant temperature sensor (CTS) reading is at least 85°C(185°F) or until the cooling fan turns on at least once.

5.3. Connect the pressure gauge with the adaptor (V/E201) to the backpressure tap, and take the backpressure reading at 2500 rpm as quickly as possible. If it is too long, the adapter (V/E201) will be damaged by the heat. Generally, backpressure should not exceed 2.0 psi. Most vehicles in good condition will operate with exhaust backpressure from 0.5 to 1.5 psi. Many technacians feel that backpressure above 1.5psi may cause problems.

5.4.If exhaust backpressure is the potential problem for a no-start condition, perform the backpressure test while cranking. In some cases, it may be possible to get an engine started after removing the O2 sensor or air injection check valve to relieve backpressure.

If the backpressure test indecates a restricted exhaust, check the following areas:

●A restricted muffler. ●A restricted catalytic converter.

●A collapsed or bent exhaust pipe.

●If tests indicate the converter is restricted and should be replaced, determine the cause of the failure to advoid future converter damage.

Also check:

●Use of leaded gasoline.

●Prolonged operation due to fuel system control problems or misfiring spark plugs.

●Improper operation of the air injection system.

●High oil consumption due to mechanical wear.

6. The vacuum in intake manifold test

Engine problems can influence the vacuum in intake manifold. So we can find many engine problems by inspecting the vacuum in intake manifold. Connect the vacuum/pressure gauge with adapter V201 to a suitable vacuum hose to intake manifold.

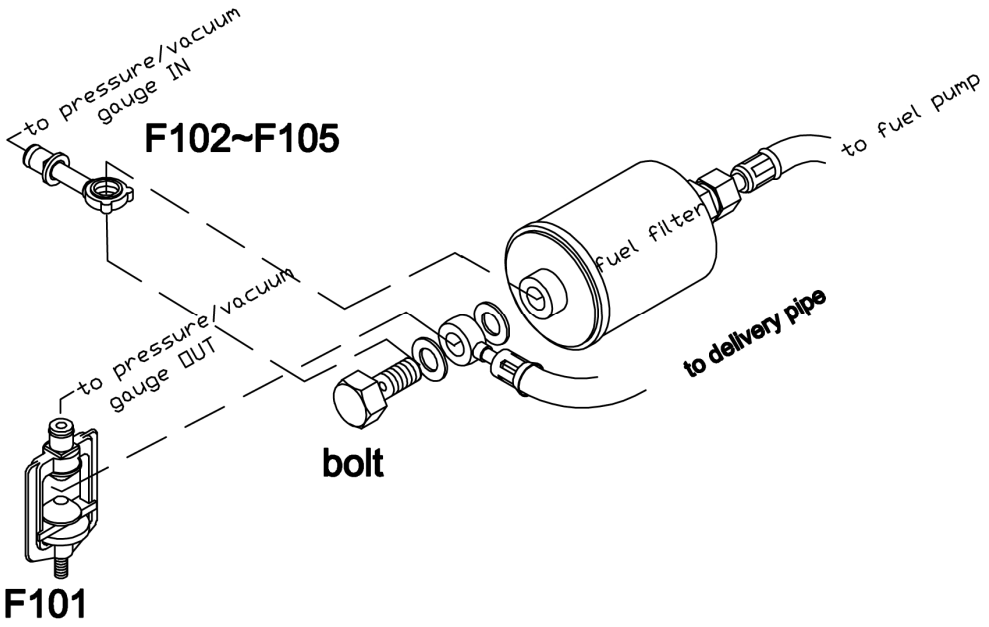
Start the engine and let it idle. Generally, the gauge reading will stay at about 17 to 21 psi. Various engine problems can be found in previous two pages.

7. Finish inspection

When inspection finished, hang the pressure/flow gauge up and put the hose of the gauge in a container so that the remaining fuel will flow out.

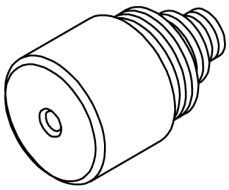
then clean it with a clean shop cloth. For maintenance, it is necessary to keep the o-rings clean and apply a light coat of oil to it before use.

Below chart explains how to use the adapters F101, F102, F105

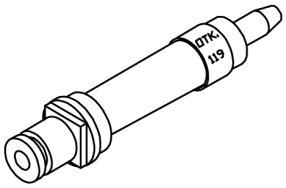


Disconnect the bolt from fuel filter or from delivery pipe. Choose a suitable adapter among F102~F105, install the adapter without sealing washers to the filter or the delivery pipe with the bolt disconnected; the torque should be smaller otherwise the adapter will damaged. Afterwards, connect the adapter of the other side to the adapter of the pressure/flow gauge, the fuel flow direction should respond to the pressure/flow gauge.

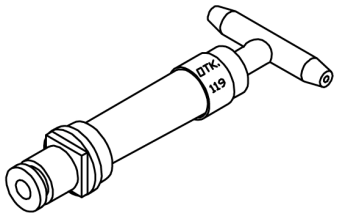
Connect the fuel pipe to F101, then connect F101 to the other side of the pressure/flow gauge connector, the fuel direction should respond to the gauge.



E301

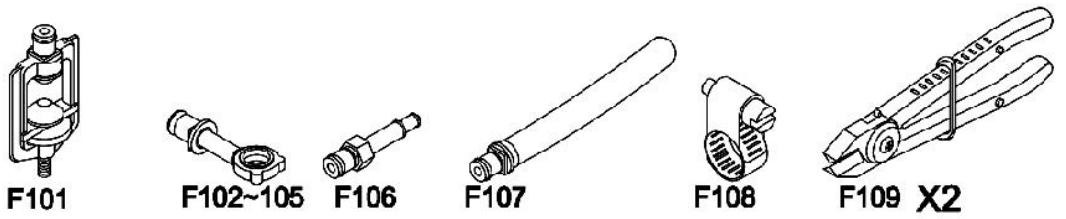


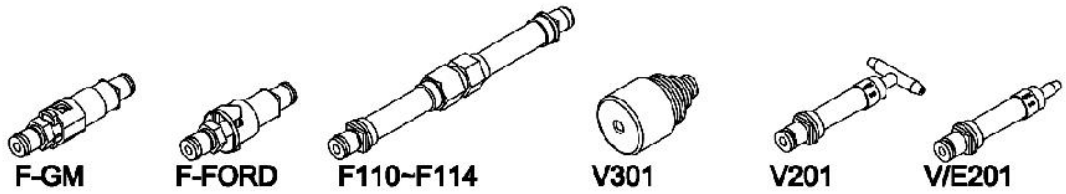
V/E201



V201

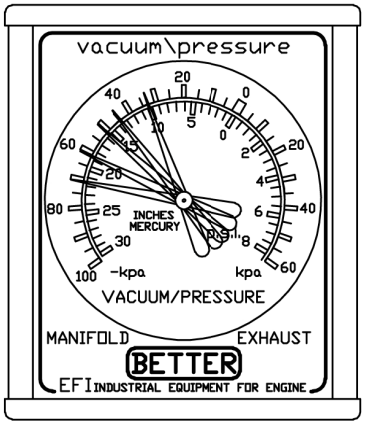
Packing List & Accessories



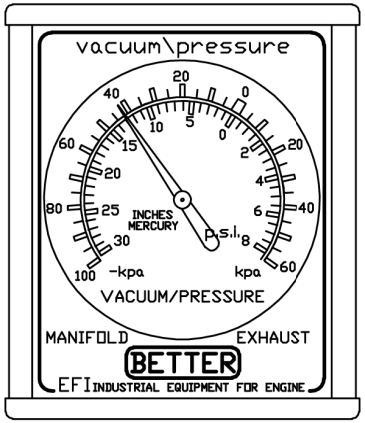


4. ⌀11X1.9 O-ringx5 ☐
5. ⌀10.7x1.8 O-ringx5 ☐
6.pin for GM-adapter x1 ☐
7.pin for FORD-adapterx1 ☐
8.truncated cone for F101X2 ☐
9.Operator's instruction manual ☐

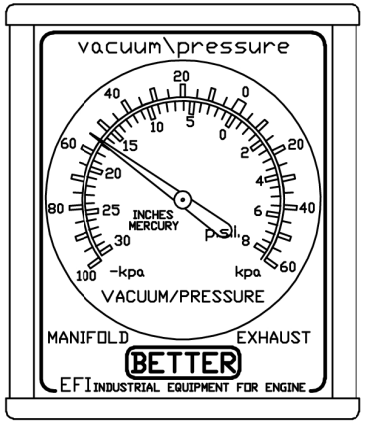
THE VACUUM GAUGE READING FOR VARIOUS PROBLEMS



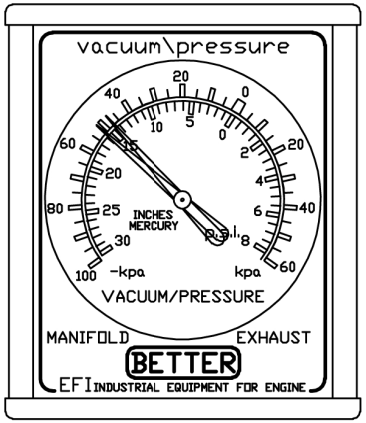
The tension of the valve spring fail: The pointer swings between 10 and 22 psi when engine runs fast; when accellerate the engine,the pointer swings hardly.



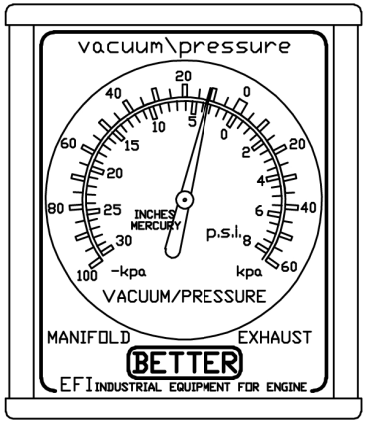
Valve timing delay:The pointer stay at a station between 8 and 15 psi steadily.



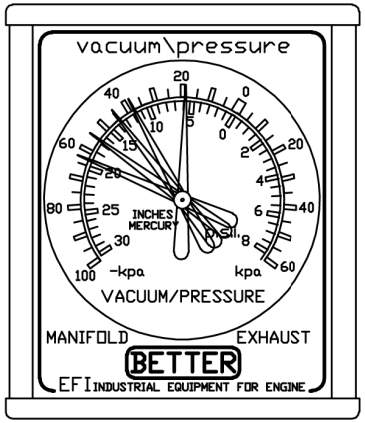
Ignition timing delay:The pointer stay at a station between 14 psi and 17 psi with engine high speed idle.



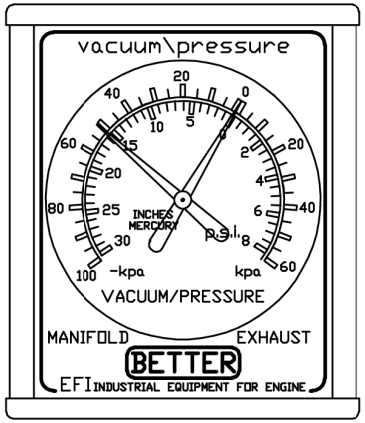
Misfiring:If the pointer swings slowly between 14–16 psi,check the spark plug electrode whether it is too small or big.



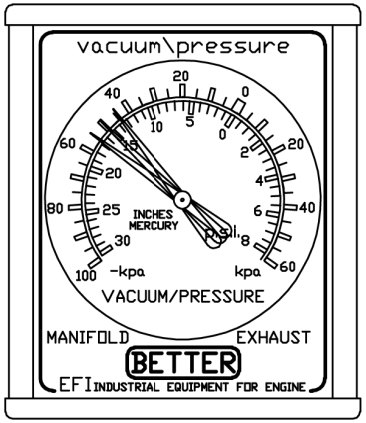
Intake manifold leakage:The pointer stay at a station between 3–5 psi with engine idle or higher idle,check the leakage in intake manifold.



Cylinder head gasket leakage (between cylinders):The pointer swings back or foward regularly between 6–19 psi.

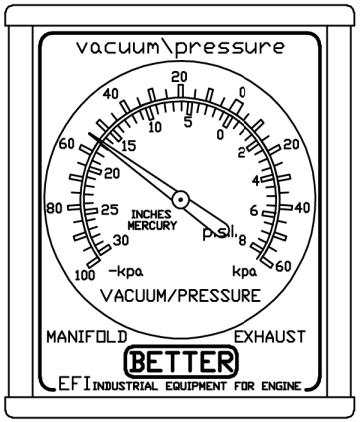


Exhaust system restricted:The pointer swings to 0 or 1 psi from high when engine first start,the n rise to 15 or 16 psi gradually.

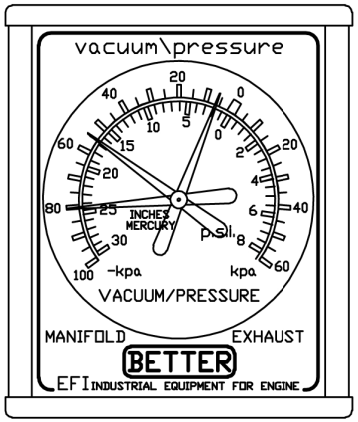


Carburetor bad adjustment:The pointer swings between 13–17 psi check the idle mixture screw adjustment in the carburetor.

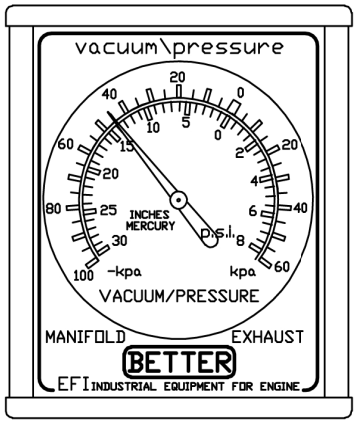
THE VACUUM GAUGE READING FOR VARIOUS PROBLEMS



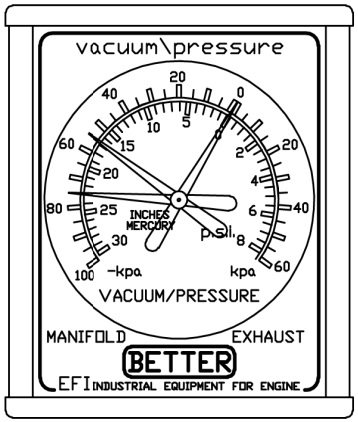
Engine OK:The gauge reading stay at about 17 to 21psi.The pointer of the gauge stay at the station steadily while the engine idle.



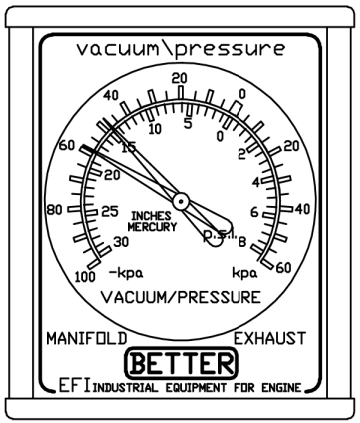
Engine OK:The poiter drop to 2 psi as the throttle valve quickly opened and closed,then the pointer will rise to 24 to 25 psi,then go to normal.If it does,the exhaust manifold is OK.



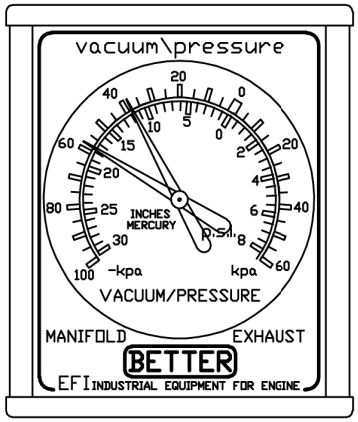
Exhaust system is restricted:
The poiter stay at the station below normal station about 2 to 3 psi with the engine idle.It also may indicate bad lubrication.



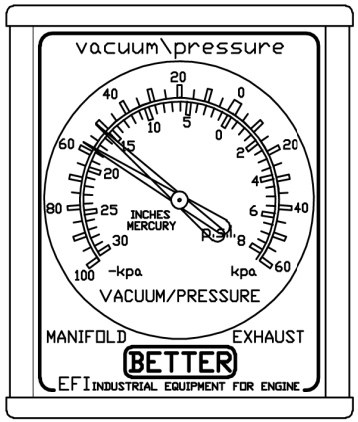
Exhaust system restricted or bad lubrication:Full open the throttle then close it quickly,the pointer will drop to 0 psi,then rise to 23 psi.



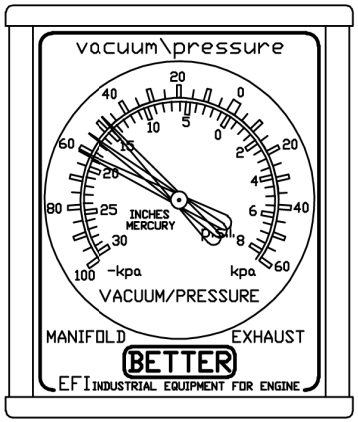
Intake valve or exhaust valve deposits: The pointer swings back 4 graduations now and then.



Valve burnt:The pointer swings back between several graduations regularly with engine idle.



Valve leakage:The pointer will swings back 2 to 3 graduations when the throttle closed;misfire every spark plug in turn so that indicate the leakage valve in which cylinder.



Valve wear:The pointer swings between 14 and 19 psi quickly while the engine idle.